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MC-12A

Supplementary description

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Table of Contents

General operating data 3
Chapter 1 3
1.1 MOUNTING ON MOUNTING PLATE 3
1.2 POWER SUPPLY 3
Chapter 2 4
2.1 FUNCTIONAL DESCRIPTION 4
2.2 COMMANDS FOR INTERFACE CONTROL 4
Chapter 3 7
3.1 DESCRIPTION OF THE I/0 PORT 7

Chapter 1

GENERAL OPERATING INSTRUCTIONS

1.1 MOUNTING ON MOUNTING PLATE

A mounting plate with bracket is supplied with the MC-12A. In order to avoid stressing the plug connection between the CE-150 printer/plotter and the MC-12A, mounting on this plate is highly recommended.

First, the CE-150 is placed with the left foot in the plastic groove on the mounting plate and then snapped into the hooks on the plate. Make sure that the CE-150 is correctly seated in the hooks. The MC-12 A is attached to the CE-150 from above and locked in place on the back of the mounting plate with the two knurled screws supplied.

The angled support plate can be inserted at the rear of the mounting plate and serves as a stand when the appliance is operated on the table.

1.2 POWER SUPPLY

The MC-12 A has its own NiCd batteries and is independent of the charge status of the CE-150. The connection location has not changed compared to the MC-12 (see MC-12 manual page 10), but unlimited operation is only possible if the connecting cable between CE-150 and MC-12 A is connected, and the mains adapter is plugged into the MC-12 A (upper socket).

Before using the MC-12A system, the MC-12A and the CE-150 should be charged for at least 14 hours. If the batteries of the MC-12A are fully charged, an operating time of approx. 4-5 hours without mains connection is possible.

Chapter 2

V.24 INTERFACE

2.1 FUNCTIONAL DESCRIPTION

The MC-12A has an interface which is generally known as V.24 or RS232C. This is an interface for serial data transmission in asynchronous mode.

The MC-12A behaves like a terminal (sending and receiving) and operates all control lines with the exception of the DCD line (PIN 8). The transmission speed of the interface can be set in 6 steps from 300 baud to 9600 baud. The speed levels 4800 baud and 9600 baud require the full function of control lines 4 and 5 on the connected receiving or transmitting device.

The connection of devices to the interface is shown in Fig. 1.

2.2 COMMANDS FOR INTERFACE CONTROL

COM ON
COM OFF

These commands are used to switch the interface on and off. This command is independent of the **MC ON** and **MC OFF** commands.

If the PC-1500 is switched off, the interface is also switched off.

V.24 Interface

SETCOM baud, parity, LF

baud: 1 = 300
2 = 600
3 = 1200
4 = 2400
5 = 4800
6 = 9600

parity: 0 = NO; 1 = ODD; 2 = EVEN
LF: 0 = CR only; 1 = after CR automatically LF

This command sets the interface parameters. The number of data bits is always 7. A parity bit is always sent after the data bit. If NO parity is set, the level is at logical 0. 2 stop bits are sent after the parity bit.

With LF, a line feed can be sent automatically after each Carriage return if desired, or the following line feed can be ignored on reception after each Carriage return.

PRINT#-232, variable or string

This command is used to send data via the V.24 interface. The command corresponds exactly to the **LPRINT** command in its further function. **USING** instructions are handled as usual.

INPUT#-232, variable

The **INPUT** command enables data to be received via the V.24 interface.

Example program for data transfer

The following program demonstrates the transmission of measurement data from the MC-12A to another computer with a V.24 interface.

The command **SETCOM 4,0,0** is used to set a transmission speed of 2400 baud. No parity is generated and no LF is sent.

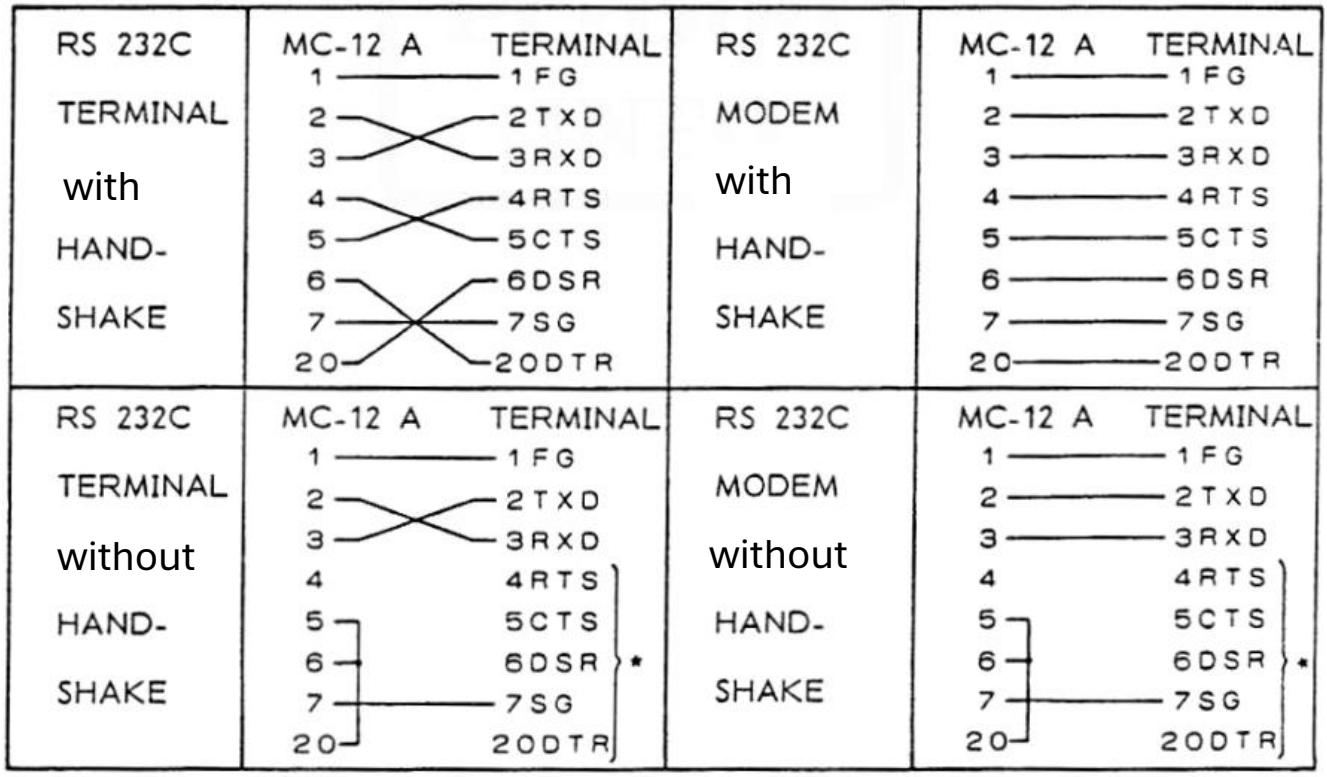
V.24 Interface

Example program

```
10 SETCOM4,0,0:COM ON
20 FOR I=1 TO BUFLEN
30 BUFREAD 1,I,A
40 PRINT#-232,A
50 NEXT I:COM OFF:END
```

PIN ASSIGNMENT OF THE V.24 INTERFACE

The following diagram shows the various connection options for the V.24 interface, depending on whether the device to be controlled is a terminal or a modem, with or without handshake lines.



For some devices, PIN 8 of the plug must also be connected to PIN 20 to enable operation. Further information on this can also be found in the descriptions of the devices to be connected.

Chapter 3

I/O PORT

3.1 DESCRIPTION OF THE I/0 PORT

The MC-12A is equipped with a digital input/output module with the type designation 8255. This module is fully available to the user and opens up a wide range of applications. The possibilities range from communication with other data processing systems to the control and monitoring of the most complex systems.

Each of the 24 digital control lines can be programmed individually as an input line or as an output line. Programming can be carried out in BASIC as well as in machine language.

CONNECTION ASSIGNMENT AND PROGRAMMING

V_{bat}	PB3	PB2	PB1	PB0	PC2	PC0	PC5	PC7	PA0	PA1	PA2	PA3
13	12	11	10	9	8	7	6	5	4	3	2	1
14	15	16	17	18	19	20	21	22	23	24	25	26
GND	PB4	PB5	PB6	PB7	PC3	PC1	PC4	PC6	PA7	PA6	PA5	PA4

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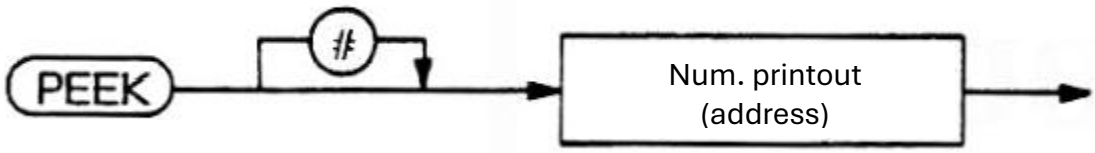
The peripheral interface module 8255 is addressed via the addresses 2000H - 2003H (hexadecimal) on the 2nd memory page of the PC-1500.

The control of the 3 8-bit output channels and the control logic is shown in the following table. following table.

I/O Port

Address	Function	Access
2000H	Channel A Data BUS	Reading
2001H	Channel B Data BUS	Reading
2002H	Channel C Data BUS	Reading
2000H	Data BUS channel A	Writing
2001H	Data BUS channel B	Writing
2002H	Data BUS channel C	Writing
2003H	Data BUS control logic	Writing

A detailed description of the 8255 follows in chapter 3.2. The most important functions are illustrated below using examples. Programming is done in BASIC. The **POKE** and **PEEK** commands are necessary. These commands are not described in the PC-1500(A) manual and are briefly described here.



Returns the decimal content of the memory cell defined by the numerical expression. **PEEK** refers to the first memory block, **PEEK#** to the second memory block.

Example:

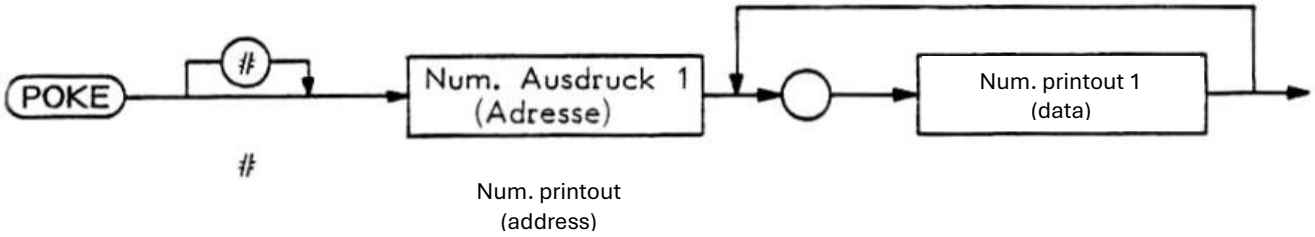
```
PEEK# &2000
```

reads the information from channel A of the 8255

&2000 = 8192: The preceding & character means that the address specification is hexadecimal.

Value range:

Addresses - 0 ... 65535; 0 ... &FFFF



Saves the data defined under numerical expression 2 under the address defined by numerical expression 1 and its subsequent addresses. **POKE** refers to the first memory block, **POKE#** to the second memory block.

Example:

```
POKE# &2000,1,254,2
```

writes the data 1, 254 and 2 to channels A, 8 and C of port IC 8255

Range of values:
Addresses - 0 ... 65535; 0 ... &FFFF
Data - 0 ... 255; 0 ... &FF

The number of data bytes that can be entered with a single **POKE** command is only limited by the maximum line length.

SAMPLE PROGRAM

The following program defines all 24 lines of the port IC as inputs and represents the logical state of each individual line by 0 or 1.

In line 10 of the program, the I/0 port is initialized in operating mode 0 and all lines are scolded as inputs.

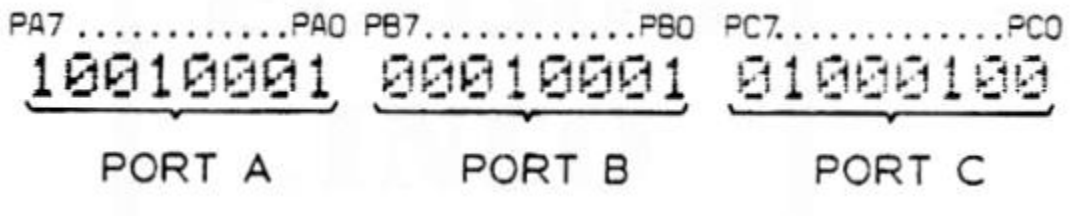
In line 20, the states at the 3 ports A, B and C are loaded into the variables A, B and C.

In the subsequent program loop, each individual bit of the variables is checked, and the result is displayed as 0 or 1.

```
10 "A" : POKE# &2003,155:WAIT 0
20 CURSOR 0: A=PEEK# &2000: B=PEEK# &2001:C=PEEK# &2002
30 FOR J=1TO 3:FOR I=7 TO 0 STEP - 1
35 D=2^I
40 IF C( J) AND D PRINT "1 "; :NEXT I : PRINT " ";:NEXT J :GOTO 20
50 PRINT "0" ;: NEXTI : PRINT " " ;:NE XT J :GOTO 20
60 END
```

Example program

OUTPUT



0 = logic level = 0 (= 0V)
1 = logic level = 1 (= 2.2 V)